



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER OF PATENTS AND TRADEMARKS  
Washington, D.C. 20231  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/406,663	09/27/1999	DANIEL R. KNEBEL	13031(YO999-	1830

7590 03/12/2003

RICHARD L CATANIA  
SCULLY SCOTT MURPHY & PRESSER  
400 GARDEN CITY PLAZA  
GARDEN CITY, NY 11530

EXAMINER

FERRIS III, FRED O

ART UNIT

PAPER NUMBER

2123

DATE MAILED: 03/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.	09/406,663
Examiner	Art Unit
Fred Ferris	2123

Applicant(s)	KNEBEL ET AL.
--------------	---------------

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1) Responsive to communication(s) filed on 27 September 1999.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

4) Claim(s) 1-43 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-43 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 07 September 1999 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.

12) The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a)  The translation of the foreign language provisional application has been received.

15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_.

## DETAILED ACTION

1. *Claims 1-43 have been presented for examination. Claims 1-43 have been rejected by the examiner.*

### *Drawings*

2. *This application has been filed with informal drawings which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.*

### *Information Disclosure Statement*

3. *The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered. (Please see specification page 2, paragraph 2)*

### *Claim Rejections - 35 USC § 112*

4. *Independent Claims 1, 8, 9, and 39 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.*

*Specifically, independent claims 1 and 39 broadly claim the following:*

*Method and means for visualizing circuit operation by:*

*Obtaining device activity by measure/simulated activity*

*Expressing device activity in representation*

*Representing activity in visual form*

*Both page 4, line 18 of the specification (preferred embodiment) and the abstract disclose that the claimed invention is drawn to a simulated version of the PICA slow motion movie which operates as specifically described on pages 18 and 19 of the specification. The PICA slow motion movie process is illustrated in Figure 8 and describes the circuit activity and photon emission simulation for each transistor by using overlays where the spatial variation of each transistor is computed by a physical model that assigns intensity to the emissions in the spatial regions of the transistor channel. Independent claims 1 and 39 have merely claimed broad limitations that can be found as part of nearly any logic analysis (i.e. logic analyzers, etc.) and circuit simulation (i.e. pSpice, etc.) process and have not included limitations relating to PICA slow motion movie process. (Please see 102(b) rejections below)*

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

**A person shall be entitled to a patent unless –**

**(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.**

5. **Claims 1-7, and 10-43 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by "Diagnosis and Characterization of Timing-Related Device Emissions by Time-Dependent Light Emission", D. Knebel et al, International Test Conference, IEEE, August 1998.**

Regarding independent claims 1 and 39: Knebel discloses visualizing circuit operation by picosecond imaging circuit analysis (PICA) as follows:

**Visualizing circuit operation:** (Figs. 2-7, pp734-735)

**Obtaining device activity by measure/simulated activity:** (Figs. 1, 6, 8, pp736-737)

**Expressing device activity in representation:** (Figs. 4-9, pp735-737)

**Representing activity in visual form:** (Figs. 5, 6, pp737)

Also see: (Abstract, Introduction, Background, Conclusions)

Regarding dependent claims 2-7, 10-38 and 40-43: Claims 2-7 and 40-43 relate to visualizing device activity, simulation of emissions, and measuring and displaying sequences. (See: Figs. 1-9, pp734-737) Claims 10-13 and 24-26 merely relate to features available with any commercially available CAD package (OrCAD, etc.) and are considered by the examiner to be inherent to Knebel. (See: Figs. 3-8, pp735) Claims 14-19 and 30-35 relate to timing, switching, and emissions modeling. (See: Figs. 4-6, 8, pp735, 737) Claims 20-23, 27 and 28 relate to simulation of emissions. (See: Figs. 8, 9, pp737) Claims 29, and 36-37 relate to test pattern (vector) and device activity. (See: Fig. 1, pp735)

**Claims 1, 2, 3, 6, 7, 14, 15, 28, 32, 33, 39, 40 and 41 are also rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent 5,555,201 issued to Dangelo et al.**

Independent claim 1 and 39 are drawn to:

*Method and means for visualizing circuit operation by:  
Obtaining device activity by measure/simulated activity  
Expressing device activity in representation  
Representing activity in visual form*

Regarding independent claims 1 and 39: Dangelo discloses **visualizing the operation of a circuit by obtaining device activity from measured or simulated activity and visually displaying results representing the device activity.** (Abstract, Summary, CL22-L55, CL24-L58, CL28-L28, CL32-L62, Figs. 8, 9, 13-15, 18-20, 25)

Regarding claims 2, 3, 6, 7, 14, 15, 28, 32, 33, 40 and 41: Dangelo also discloses sequence relationships (Figs. 13-15), IC CAD viewer (Figs. 18, 19), sequence graph (Figs. 13-15), simulated activity (events/states) (Figs. 8, 9, 13-15, 18-20, 25), switching events (Figs. 18, 19), switching behavior from netlist (Figs. 2, 8, 9), waveform transitions (Figs 18, 19).

**Claims 1, 8, 9, and 39 are further rejected under 35 U.S.C. 102(b) as being clearly anticipated by U.S. Patent 5,251,159 issued to Rowson.**

Regarding independent claims 1 and 39: Rowson discloses **visualizing the operation of a circuit by obtaining device activity from measured or simulated activity and visually displaying results representing the device activity.** (Abstract, Summary, CL2-L11-18, CL3-L13-23, 30-42, 43, 45-61, 65, CL5-L33-45, Figs. 1, 4, 5)

Regarding dependent claims 8 and 9: Rowson discloses a visual form of **animation of the device activity.** (CL30-L66, CL5-L34, Figs. 4, 5)

### ***Conclusion***

7. *The prior art made of record and not relied upon is considered pertinent to applicant's disclosure, careful consideration should be given prior to applicant's response to this Office Action.*

*U.S. Patent 6,483,327 issued to Bruce et al teaches time-resolved detection of photoemissions in integrated circuit testing.*

*U.S. Patent 5,528,156 issued to Ueda et al teaches IC analysis by photoemission detection.*

*"Failure Analysis of ULSI circuits Using Photon Emission", Y. Uraoka, IEEE Log Number 9211664, IEEE 1993 – teaches IC analysis by photoemission detection.*

*"The Attack of the "Holey Shmoos": A Case Study of Advanced DFD and Picosecond Imaging Circuit Analysis (PICA)", W. Huott, ITC International Test Conference, IEEE, January 1999 – teaches IC analysis by PICA.*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Fred Ferris whose telephone number is 703-305-9670 and whose normal working hours are 8:30am to 5:00pm Monday to Friday.

Any inquiry of a general nature relating to the status of this application should be directed to the group receptionist whose telephone number is 703-305-3900.

The Official Fax Numbers are:

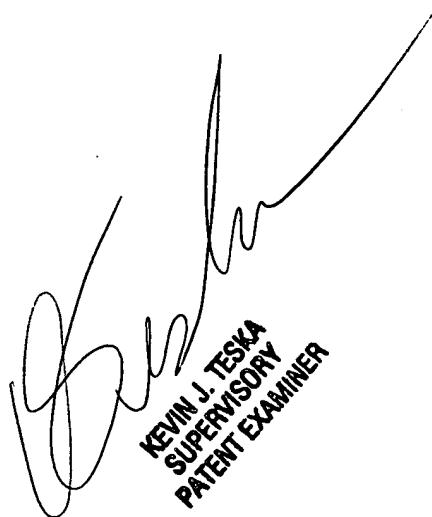
After-final	(703) 746-7238
Official	(703) 746-7239
Non-Official/Draft	(703) 746-7240

Application/Control Number: 09/406,663  
Art Unit: 2123

Page 7

*Fred Ferris*, Patent Examiner  
Simulation and Emulation, Art Unit 2123  
U.S. Patent and Trademark Office  
Crystal Park 2, Room 5D53  
Crystal City, Virginia 22202  
Phone: (703) 305 - 9670  
FAX: (703) 305 - 7240  
Fred.Ferris@uspto.gov

February 28, 2003



KEVIN J. TESKA  
SUPERVISORY  
PATENT EXAMINER